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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/822,078

04/08/2004

Badih El-Kareh

TID-34937

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01/23/2006

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EXAMINER

VU, DAVID

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 01/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/822,078

Applicant(s)

EL-KAREH ET AL.

Examiner

DAVID VU

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/15/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/26/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1- 14 are rejected under 35 U. S. C. 102(b) as being anticipated by Freeman et al. (US Pat. 6,472,288, herein after Freeman).

Regarding claims 1 and 8, Freeman discloses a method of fabricating complementary bipolar transistors (HBT1/HBT2) with SiGe base regions, comprising the steps forming on a wafer a first epitaxial layer of silicon region HBT1 (epi-collector 120) and a second epitaxial layer of silicon region HBT2 (epi-collector 120) (fig. 2); forming a first crystalline layer of SiGe 610 over the first epitaxial layer of silicon region HBT1 (fig. 6); and forming a second crystalline layer of SiGe 810 over the second epitaxial layer of silicon region HBT2 in steps each separate from the other such that the second crystalline layer of SiGe 810 has a different germanium profile than the first crystalline layer of SiGe 610 (See Abstract and col. 2, lines 41-43).

Regarding claims 2 and 9, Freeman discloses a method of fabricating complementary bipolar transistors (HBT1/HBT2) with SiGe base regions, comprising the steps forming on a wafer a first epitaxial layer of silicon region HBT1 (epi-collector 120) and a second epitaxial

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layer of silicon region HBT2 (epi-collector 120) (fig. 2); forming a first crystalline layer of SiGe 610 over the first epitaxial layer of silicon region HBT1 (fig. 6); and forming a second crystalline layer of SiGe 810 over the second epitaxial layer of silicon region HBT2 in steps each separate from the other such that the second crystalline layer of SiGe 810 has a different germanium profile than the first crystalline layer of SiGe 610 (See Abstract and col. 2, lines 41-43), wherein: prior to a first step of the deposition of the layer 610 of silicon enhanced with germanium over said collector regions 120, a continuous layer of silicon dioxide 310 is deposited and over layer of silicon dioxide 310, a polycrystalline layer of silicon 320 is deposited (fig. 3), after which polycrystalline layer of silicon 320 and layer of silicon dioxide 310 over first collector region HBT1 are removed (fig. 4); the first step of the deposition of the layer of silicon enhanced with germanium 510/610 is implemented so that a continuous layer of silicon enhanced with germanium 510/610 is deposited that comprises a crystalline layer of SiGe 610 formed over the epitaxial layer of silicon 120 in first collector region HBT1 (figs. 5&6) and a polycrystalline layer of SiGe 510 formed over polycrystalline layer of silicon 320 (fig. 5); and after which a continuous etch stop/mask 730 is deposited over crystalline layer of SiGe 510 and polycrystalline layer of SiGe 320 (fig. 6).

Regarding claims 3 and 10, Freeman discloses wherein prior to a second step of the deposition of the layer 810 of silicon enhanced with germanium over second collector region HBT2, portions of etch stop/mask 730, polycrystalline layer of SiGe 610 and polycrystalline layer of silicon 320 as well as layer of silicon dioxide 310 are removed from over second collector region HBT2 (fig. 7); the second step of deposition of layer 810 of silicon enhanced with germanium is implemented so that a continuous further layer of silicon is crystalline

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deposited (layer 710), enhanced with germanium (epi-base layer 810) so that over epitaxial layer 120 of silicon in second collector region HBT2 further layer of crystalline SiGe 810 is formed and over polycrystalline layer of SiGe 610 a further layer of polycrystalline SiGe 810 is formed (fig. 8); after which a continuous resist is deposited; and then resist and further layer of polycrystalline SiGe 810 on the HBT1 region are totally removed, further layer of crystalline SiGe 810 remaining over second collector region HBT2 (fig. 9).

Regarding claims 4 and 11, Freeman discloses second layer of crystalline SiGe 810 is in-situ doped during deposition (col. 4, lines 62-67).

Regarding claims 5 and 12, Freeman discloses further comprising the step of doping second layer of crystalline SiGe by ion implantation (col. 4, lines 15-24 and lines 62-67).

Regarding claims 6 and 13, Freeman discloses etch stop and resist consist of silicon dioxide (col. 4, lines 30-32).

Regarding claims 7 and 14, Freeman discloses further comprising the step of forming a resistor by implantation into a region of first polycrystalline layer of SiGe outside of first and second collector regions (col. 3, lines 53-64).

Conclusion

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (571) 272-1798. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can

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be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR, Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DAVID VU
PRIMARY EXAMINER